

CLAIMS

1. An electromagnetically operated device, comprising an electromagnet, said electromagnet including a magnetic guide having a movable armature and at least one air gap, a magnetizing coil provided on said magnetic guide, said magnetic guide having at least a part formed as an insert of a magnetically hard material, said magnetic guide having an immovable part formed as a cylinder, said movable armature being provided with a cover of said cylinder, said magnetizing coil being located inside said cylinder coaxially to the latter, a rod extending along an axis of said cylinder, located in an inner hollow of said cylinder, and having at least a part of composed of a electromagnetically soft material, said armature being formed so as to close said magnetic guide with formation of a three dimensional closed structure including said cylinder, said cover, said rod with a possibility of providing a holding force which is equal to a pulling force formed by a winding of said magnetizing coil during a supply of a short-term current pulse to the winding of said magnetizing coil and demagnetization of a material of said rod.

2. An electromagnetically operated device as defined in claim 1, wherein the electromagnetically operated device is formed as a valve, comprising a housing forming said cylinder, a seat substantially coaxial with the housing, said magnetizing coil being located coaxial in said housing, said movable armature located in a coaxial passage of said coil, and passages for passing a fluid between at least two cavities of the valve.

3. An electromagnetically operated device as defined in claim 1, wherein the electromagnetically operated device is formed as a compressor, comprising a housing forming said cylinder and composed of two parts each having said armature with an inlet valve and a spring located in an axial passage of said magnetizing coil, with said armatures connected with one another by a piston.

4. An electromagnetically operated device as defined in claim 1, wherein the electromagnetically operated device is formed as a starter relay for an automobile, with said armature connectable to a lever

for turning on of a drive gear of a starter, and a pusher located in an opposite end of said armature.

5. An electromagnetically operated device as defined in claim 1, wherein the electromagnetically operated device is an electromagnetic coupling including a stator forming said cylinder and provided with a rod and connected to said insert so that an end surface of the rod is in a plane with an end surface of the stator, said magnetizing coil surrounding the rod, and the movable armature being formed as a disc and capable of closing with its plane a magnetic circuit of said magnetic guide during rotation of the armature relative to the stator.

6. An electromagnetically operated device as defined in claim 1, wherein the electromagnetically operated device is formed as an electromagnetic lock, comprising a housing forming said cylinder, magnetically hard insert, said magnetically soft rod formed as a bar, said magnetizing coil, and said armature.

7. An electromagnetically operated device as defined in claim 1, wherein the electromagnetically operated device is formed as a lifting device, said cover being formed by a load to be lifted.

8. An electromagnetically-operated device, comprising an electromagnet; means for controlling a magnetic flux of the electromagnet with a relay pulling characteristics characterized by at least two stable levels of values of a magnetic flux in a magnetic guide, with a supply of controlling pulses of electric current into a winding of a magnetizing coil with obtaining a pulling force of a moving part of a magnetic guide of the electromagnet at least with one air gap, the magnetic guide being formed at least partially of a electromagnetically soft material which a property to maintain at least two stable conditions of magnetization; means for supplying the controlling pulses as two short-term pulses having an opposite polarity and supplied into the magnetizing coil on the magnetic guide of the electromagnet, with a supply of a first pulse providing a closing of a magnetic circuit and minimization of magnetic resistance of the magnetic guide due to minimization of the air gap of the magnetic guide with subsequent maximization of the magnetic flux and the magnetic guide with its transfer to one of the stable conditions characterized by a

maximum value of an magnetic flux in the magnetic guide which corresponds to an energy of the controlling pulse action, with a possibility of maintaining the magnetic guide of the electromagnet in this stabile condition, and providing its holding or attracting force until a supply of a second controlling pulse of electric current of the opposite polarity whose energy characteristic has a value sufficient for transferring the magnetic guide into a second stabile condition which is characterized by a different value of the magnetic flux and a different value of the holding or attracting force.

9. A method of operating an electromagnetically operated device, comprising the steps of providing an electromagnetic drive including an electromagnet with a magnetic guide having a movable armature and at least one air gap, a magnetic coil, with the magnetic guide having at least a part formed as an insert of a magnetically hard material, an immovable part formed as a cylinder, with the movable armature formed as a cover of the cylinder; providing a rod extending along an axis of the cylinder, located in an inner hollow of the cylinder and having at least a part composed of a magnetically soft material; and closing by the armature the magnetic guide with formation of a three

dimensional closed structure including the cylinder, the cover, the rod with a possibility of providing a holding force which is equal to a pulling force formed by a winding of the magnetizing coil during a supply of a short-term current pulse to the winding of the magnetizing coil and demagnetization of the material of the rod.

10. A method as defined in claim 9; and further comprising forming the electromagnetically operated device as a valve with a housing forming said cylinder, and a seat substantially coaxial with the housing, locating said magnetizing coil coaxial in said housing, locating said movable armature in a coaxial passage of said coil, and passing a fluid between at least two cavities of the valve through passages.

11. A method as defined in claim 9; and further comprising forming the electromagnetically operated device as a compressor with a housing composed of two parts forming the cylinder and each having said armature with an inlet valve and a spring located in an axial passage of a

magnetizing coil, and connecting two armatures with one another by a piston.

12. A method as defined in claim 9; and further comprising forming the electromagnetically operated device as a starter relay for an automobile, connecting said armature to a lever for turning on of a driver gear of a starter, and providing a pusher located in an opposite end of said armature.

13. A method as defined in claim 9; and further comprising forming the electromagnetically operated device as an electromagnetic coupling including a stator forming said cylinder and provided with a rod and connected to said insert so that an end surface of the rod is in a plane with an end surface of the stator, surrounding the rod by said magnetizing coil, and forming the movable armature formed as a disc and capable of closing with its plane said magnetic circuit of a magnetic guide during rotation of the armature relative to the stator.

14. A method as defined in claim 9; and further comprising forming the electromagnetically operated device as an electromagnetic lock with a housing forming said cylinder, said magnetically hard insert, said magnetically soft rod formed as a bar, and said magnetizing coil, and said armature.

15. A method as defined in claim 9; and further comprising forming the electromagnetically operated device as a lifting device, and using a load to be lifted as said cover.